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ABSTRACTS

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Pneumothorax in Presence of Bronchial Tuberculosis.—Forty patients with definite bronchial ulceration or stenosis were given pneumothorax. After several years it was found that 43 per cent were dead, 7 per cent were still uncontrolled, and of the other 50 per cent (20 cases) 9 have unexpandable lungs. Only 6 of these healed cases had stenosis or extensive ulceration not rapidly responding to treatment. The percentage of severe complications was high: atelectasis and empyema, each 43 per cent; anaerobic infection, 18 per cent; unexpandable lung, 23 per cent. Death rates did not correspond to the stage of the parenchymal disease, 5 of 6 minimal cases died, and the majority of the rest (25 cases) were classified as only moderately advanced. Fifty-four per cent of the stenotic and 50 per cent of the extensive ulcerative cases died. Postmortem studies show that the bronchial disease is far more extensive than inspection of the surface through a bronchoscope indicates. As involved mucous glands cannot function, the sputum which collects peripherally remains viscid. A stenosis is easily converted into a complete occlusion. This leads to progressive tuberculosis, anaerobic infection, tuberculous empyema and death. Pneumothorax produces a concentric type of collapse which impairs bronchial function, (limited motion with change in position), and decreases bronchial drainage. Thoracoplasty does not do this, as its maximal collapse is peripheral and there is no pleural space to be infected. Pneumothorax should be used only when bronchial disease is minimal or responds readily to local treatment (30 per cent silver nitrate). In the cases of severe stenosis an early thoracoplasty is the treatment of choice. —*The Management of Pulmonary Tuberculosis Complicated by Bronchial Tuberculosis, T. N. Rafferty & D. O. Shields, J. Thoracic Surg., February, 1943, 12: 225.*—(*W. M. G. Jones*)

Effusion in Pneumothorax.—Because of the insufficient number of beds available for tuberculous patients in India, pneumothorax treatment is necessarily ambulatory from the beginning. Five hundred patients (403 male, 97 female) who received pneumothorax in an outpatient department were studied. Of these, 238 (47.6 per cent) showed the presence of effusion in the pleural space some time during the course of treatment. It has been stressed that as the duration of treatment has a definite effect on the incidence, and as this duration is likely to vary from one study to another, a direct comparison of total incidence figures is not justified. For this reason, a curve showing the risk of effusion at different periods in the course of treatment has been worked out. This shows that, out of 100 persons having artificial pneumothorax treatment, 11 develop effusion in the first month. Of the rest, 13 will develop effusion in the second month. Of the rest 7 or 8 will develop effusion in the next month and so on, with the result that after eighteen months' treatment only 34 will not have developed an effusion. The curve indicates that the rate is higher in the earlier months. The influence of such factors as sex, age, habitation, stage of dis-

ease, character of disease, nature of collapse, presence or absence of adhesions and mobility of mediastinum has been assessed, taking the duration of treatment into consideration in each case. None of these factors showed any significant effect on the formation of effusion. There is only a suggestion that in childhood the rate is higher, and that rural persons show a slightly lower rate in the first month. No relationship could be detected between the amount of effusion and the time of its commencement. The proportion of slight to moderate amount of effusion is found to be 3 to 2. The number with massive effusion is small.—*Pleural Effusion in Artificial Pneumothorax: Its Incidence in Cases Treated from the Beginning in an Out-Patient Department, P. K. Sen, C. Chandra Sekar & K. N. De, Indian M. Gaz., October, 1943, 78: 498.*—(*G. C. Leiner*)

Effusion in Pneumothorax.—Two hundred and fifty patients with artificial pneumothorax were studied at Yadabpur Tuberculosis Hospital from 1938 to 1941. Effusion occurred in 151 (60.4 per cent) of these patients. In 85 (34.0 per cent) it was large enough to cover the dome of the diaphragm. The smaller the area of the lung involved the lower the incidence of effusion. In 56.2 per cent of cases, the effusion developed in the absence of adhesions. Where adhesions were present the risk of fluid formation was probably somewhat greater. It was noted that 62.3 per cent of effusions developed with negative intrapleural pressure; 71.4 per cent of all effusions formed within the first three months of treatment; 65.2 per cent of the effusions were accompanied by varying degrees of fever; 37.2 per cent of the effusions were absorbed without affecting the course of artificial pneumothorax treatment. In 25.2 per cent, the absorption was followed by obliteration of the pleural space, and artificial pneumothorax treatment had to be abandoned. Spontaneous absorption occurred in 83.6 per cent of small and 45 per cent of large effusions. Interference in some form was needed in 54.2 per cent of all cases. The average period required for the absorption was eleven weeks for small effusions and about twenty weeks for large effusions.—*Pleural Effusion in Pneumothorax Treatment, (Statistical Survey), K. S. Ray, N. N. Sen & N. C. Talukdar, Indian M. Gaz., October, 1943, 78: 517.*—(*G. C. Leiner*)

Harmlessness of Thoracoscopy.—Seventy-three patients at the Olive View Sanatorium had a thoracoscopy between 1930 and 1942. The series was reviewed to see if the procedure was attended with any ill effects. It was found that, while 30 per cent developed some fever postoperatively, in only 3 per cent was it over 102°F. Average duration of fever was a little over two weeks. Other complications such as haemorrhage, spontaneous pneumothorax, bronchopleural fistula, pleural effusions, obliterative pleuritis and extension of the pulmonary process were all found to be slight or not above the average incidence for such complications in pneumothorax cases not subjected to the thoracoscopic examination. Since this study demonstrates the harmlessness of the thoracoscopic examination to determine operability of intrapleural adhesions, the question is asked why this procedure should not be done earlier. In this series the interval between induction of pneumothorax and date of thoracoscopy averaged nine months, but in 24 cases the interval was ten months or more, the longest thirty-two months. The earlier use of the procedure is recommended, and the abandonment of ineffective pneumothorax for other collapse measures when adhesions are found to be inoperable.—*Thoracoscopy in Pulmonary Tuberculosis, J. Goorwitch, J. Thoracic Surg., April, 1943, 12: 361.*—(*W. M. G. Jones*)

Extrapleural Pneumothorax.—Forty-six operations were performed on 38 cases. Eight had bilateral operations. Cases selected were those with bilateral apical cavitation; cavities in the apex of the good lung in thoracoplasty cases; a few older patients (fifty-five to sixty-seven years of age) because of their age; and 3 cases of "balloon tension" cavity. All were chronic cases. Of these 38, 13 are dis-

charged, 21 still under treatment, and 4 are dead. In 19 cases sputum was converted (by examination of concentrated sputum, and guinea pig inoculation). Three other cases had positive guinea pigs only. These 22 cases (58 per cent) are considered negative. Eleven of the 13 discharged cases are working. Twelve patients (32 per cent) developed empyema. Azochloramide was used in the treatment of the pure type of infection. Six of these 12 cleared. A total of 26 spaces were converted to oleothorax (using mineral oil), and 6 spaces were closed by thoracoplasty. The author feels that extrapleural pneumothorax still has a definite and worth while place in the treatment of chronic tuberculosis.—*Extrapleural Pneumothorax, J. G. Russo, J. Thoracic Surg., April, 1943, 12: 316.*—(*W. M. G. Jones*)

Technique of First-stage Thoracoplasty.—The author suggests that the usual long paravertebral incisions, passing around the angle of the scapula, are unnecessarily traumatizing and shocking. His approach is effected by two incisions—the first, anteriorly, parallel to and 3 cm. lateral to the sternal border, running down from the clavicle about 10 cm. The second incision is made posteriorly, halfway between the spinous processes and the upper half of the border of the scapula. The medial halves of the first three ribs are removed via the first incision, together with their costal cartilages. The remainder of the first three ribs is removed via the posterior incision, together with their transverse processes. The second-stage thoracoplasty is performed two and one-half to three weeks later through a second short posterior incision, overlapping the lower third of the previous incision and extending downward from it for about 10 to 12 cm. Cyclopropane anaesthesia is used and the patient placed and draped so as to provide access to both the anterior and posterior chest wall. Through the first incision, the second rib is first resected for about 12 cm. The first rib is then resected for about 6 cm., and lastly the third rib for about 10 to 12 cm. He stresses a more limited resection of the third rib if paradoxical respiration is too pronounced. Whereas the patient is almost flat on his back for the anterior incision, he is then rolled forward for the second half of the operation. Through the posterior incision, the third, second and first ribs are removed in order. Postoperative temperature rises are minimal, pain is less pronounced and there is a greater willingness to execute the changes of position and perform the exercises of flexion and extension of arms and legs with each change of position. He emphasizes that short incisions are possible only after thorough familiarity with the longer and more revealing paravertebral incision and concludes that first-stage upper thoracoplasty is effected with less shock and less loss of blood when performed through two small incisions instead of the conventional long paravertebral incision. —*First-stage Thoracoplasty, E. Holman, Ann. Surg., 1943, 117: 315.*—(*D. J. Rednor*)

Results of Thoracoplasty.—Excellent results were obtained in 150 consecutive cases having 430 operations done by 14 different surgeons of the Bellevue Chest Service, 1938–1942. The criteria of success: absence of cavity by X-ray and disappearance of tubercle bacilli in concentrated sputum or gastric washings. A longer follow-up was not possible. Only 25 cases were Negroes. The group included 107 cases of parenchymal disease, 38 of tuberculous empyema, and 5 of extrapleural pneumothorax. The danger of continuing an ineffective pneumothorax is shown by the fact that 33 of the 38 empyemal cases were having artificial pneumothorax. Moreover, 42 per cent of the empyemal group required more than three stages of thoracoplasty, some as many as eight or ten stages. Only 7.5 per cent of the parenchymal group required more than three stages. Seventy-one per cent of the bilateral cases (52.7 per cent of the series) were successful as compared to 64.8 per cent of the unilateral ones. Wound infections developed in 34.2 per cent of the empyemal group, but in only 9.3 per cent of the parenchymal group. In 10.7 per cent of all cases there was some degree of

spread of the disease following operation; 2 of these 16 cases died. Anaesthetics used were chiefly cyclopropane or procaine locally. Silk was used exclusively and did not offer difficulties even in infected woulds. An average of three ribs were removed at each stage. During the last two years sulfanilamide (up to 8 g.) has been dusted into the wound with definite benefit. There were 8 deaths in the series (6 per cent) but some of these were very poor risks and should not have been subjected to operation. Of the whole 150 cases, 74.7 per cent of cavities and 63.2 per cent of the empyemata were apparently closed at time of discharge.—*Analysis of 150 Cases of Thoracoplasty for Tuberculosis at Bellevue Hospital, A. W. Harrison & F. B. Berry, J. Thoracic Surg., February, 1943, 12: 292.*—(*W. M. G. Jones*)

Thoracoplasty with Contralateral Pneumothorax.—Forty-four cases of chronic bilateral pulmonary tuberculosis were given an average of 3.9 stages thoracoplasty each on the side opposite a pneumothorax. Almost all had bilateral cavities. Thoracoplasty was started whenever there was sufficient serial X-ray evidence of satisfactory progress of lesions on the pneumothorax side; in 30 cases the cavities had either closed or were smaller at the time of surgery. Fifteen of the cases (34 per cent) had some degree of tuberculous laryngitis (3 cases) or bronchitis (12 cases), and 6 of these (40 per cent) died. In 13 cases the surgical program could not be completed because of complications. The mortality rate for the whole series was 29.5 per cent. A year after completion of all surgery there were 31 living patients of which 64.5 per cent showed sputum conversion, and 83.8 per cent cavity closure under the thoracoplasty. Of these 31, 14 are at home, 12 pursuing gainful occupations. Each of these patients was tested by progressive regulated exercises six to twelve months after sputum conversion before being sent home. This is considered an excellent showing when the material is considered, only one case had minimal disease on the pneumothorax side, and 34 per cent had tracheobronchial or laryngeal disease. In the whole group, sputum conversion was obtained in 45.5 per cent (20 cases). A more frequent use of thoracoplasty in the presence of contralateral pneumothorax is desirable.—*Thoracoplasty and Contralateral Pneumothorax in Bilateral Pulmonary Tuberculosis, R. W. Buxton & P. V. O'Rourke, J. Thoracic Surg., April, 1944, 13: 106.*—(*W. M. G. Jones*)

Intracavitary Drainage.—By 1942 Monaldi was able to report on 700 cases, and by that time more than 150 papers had been written on the subject, many of them favorable. The determining factors of success with this therapy are the age of the cavity, that is, the condition of its wall, and the behaviour of the draining bronchus. Cavities are rarely as large as they appear on X-ray films. The actual loss of substance is overshadowed by pericavitary atelectasis of the surrounding tissue, positive pressure within the cavity due to valvular action of the bronchus, and possibly an additional pleuro-pulmonic reflex causing contraction of the smooth muscle of the interalveolar septa in the vicinity. Recent thin-walled cavities diminish quickly in size. But even old cavities with fairly rigid walls often show a surprising amount of shrinkage over a period of time. When suction drainage is a total failure the fault is usually with a wide open bronchus. If more air can be removed by the drainage apparatus than seeps back through the bronchus, therapy is eventually crowned with some measure of success. Favorable systemic effects frequently become evident within a few days after institution of treatment. If the cavity was not isolated but surrounded with tuberculous foci, these often show exacerbation postoperatively. On the other hand, the opposite may happen, and even foci at some distance from the cavity may regress spontaneously following drainage. Frequently the area surrounding the cavity seems to become quite radiopaque a few hours after institution of drainage. This is due to exudation into the previously atelectatic alveoli.

Following resorption of the exudate these atelectatic areas expand and help to obliterate the cavity space. As far as technical details are concerned, obliteration of the pleural space must be present and, if not, it must be obliterated artificially. To place the catheter correctly it is good to have preoperative recourse to spot-films and sagittal tomograms, so as to lessen the time of exposure of the ungloved hands at the time of operation. A pneumothorax needle with a stilet which is longer than the needle and slides in it very easily is preferable. On introducing the needle the stilet slips into the cavity as soon as the wall is punctured. The pressure is always ascertained before introducing the catheter. The catheter should be as thin as possible. An anterior approach, in the first or second intercostal place, as close to the sternum as is feasible is generally chosen. Only in cavities below the level of the hilum which are located posteriorly is a posterior approach used. The chance of soft tissue infection is greater with posterior drainage. Although Monaldi advocated to drain from eight to twelve hours daily, it seems advisable to drain continuously and to keep the pressure as constant as possible, much as is advocated for pneumothorax treatment. Initially a pressure of from minus 10 to minus 20 cm. of water is used, but that depends on the type of cavity and the condition of the bronchus. The pressure in the drainage system must be low enough so that an effective negative pressure is maintained in the cavity. All systems used for the purpose should have a safety valve which will not permit the pressure to fall beyond a certain point. The complications are empyema, which is always preventable, infections of the soft tissues, which are rarely serious, haemorrhages, and an occasional case of air embolism. To prevent the latter accident the operation is always done with the patient recumbent, and if attempts at locating the cavity are futile the procedure is abandoned promptly. The duration of the treatment varies with the type of case. In recent thin-walled cavities the average length is seven months. In no case is the procedure terminated before it has not been ascertained that the draining bronchus is sealed. This is done by lipiodol injection. Sputum and secretions, if any, must be negative, and tomography must fail to show a cavity. The catheter is shortened gradually as it is withdrawn. To remove it in one stage may mean relapse through reopening of the cavity. Very few cavities contraindicate the procedure. The success is greatest with thin-walled, moderate sized cavities, and, if pneumothorax cannot be given, Monaldi drainage should be the first choice in such cases. With very large or thick walled cavities it is best to plan on a combination of drainage and thoracoplasty immediately and not make thoracoplasty dependent on the success of drainage. The author has used the above combination in 76 cases. Thoracoplasty was done as soon as four weeks after institution of drainage in one case. Drainage is continued following the rib resection until the criteria for cure as mentioned above apply. Frequently it was only through preliminary drainage that the patients were made fit for the major operation. The chance of postoperative spread is also decreased. Among the 76 cases mentioned, 67 per cent have become completely negative. There were 8 deaths, 4 postoperatively, and 4 from progressive tuberculosis. Considering the fact that all cases were far advanced, and that all cavities were of the size of an apple or larger, the results can be called favorable.—*Die Stellung der Saugdrainage nach Monaldi in der Kollapstherapie der Lungentuberkulose, A. Brunner, Schweiz. med. Wchnschr., August 21, 1943, 73: 1013.*—(*H. Marcus*)

Tension Cavities.—A tension cavity develops in patients with partial bronchial obstruction permitting the entrance of air into the cavity more freely than the escape of air. A large percentage of pulmonary cavities are tension cavities and rarely close with thoracoplasty. It is believed that many residual cavities were tension cavities prior to thoracoplasty. The detection of tension cavities can be made only by needling of the cavity

and recording of the intracavitary pressures. This should be done in all cavities larger than 2.5 cm. prior to thoracoplasty. Transthoracic intracavitary suction drainage, as introduced by Monaldi in 1938, is recommended for use in tension cavities only. A new technique and instruments for needling and draining tension cavities are described. Contraindications are: very sick patient, free pleural space, cavities located near the hilum, haemoptysis. In 150 instances, cavities were needled and 27 cavities were drained without a single complication of haemorrhage, pleural empyema, spontaneous pneumothorax or air embolism. Intracavitary suction drainage will reduce large tension cavities to the size of a catheter; to obtain permanent closure a partial thoracoplasty is essential. In giant positive pressure cavities, anterior stage thoracoplasty precedes suction drainage and the latter is followed by posterior stage thoracoplasty. Negative pressure giant cavities close readily with thoracoplasty. By the use of a combination of transthoracic intracavitary suction drainage and thoracoplasty in the treatment of tension cavities the ideal of collapse therapy is attained, namely a maximum collapse of diseased areas with a minimum of damage to normal parenchyma.—*The Determination and Treatment of Pressure Cavities in Pulmonary Tuberculosis, A. M. Vineberg & W. E. Kunstler, Surg., Gynec. & Obst., March, 1944, 78: 245.*—(*G. C. Leiner*)

Pneumonectomy.—Total pneumonectomy was first performed about ten years ago. Individual ligation of hilar structures has many advantages over mass ligation of the hilar pedicle and is the generally accepted technique at present. Indications for pneumonectomy include those conditions in which one lung is so seriously diseased that its retention would cause the death of the individual or would interfere to a marked degree with his well-being. Such conditions may be classified under (*a*) primary new growths, (*b*) chronic suppurative processes involving most if not all of one lung, and (*c*) certain selected cases of pulmonary tuberculosis. Bronchogenic carcinoma constitutes the chief indication and comprises 8 to 10 per cent of all carcinomata. Any male patient of middle age or beyond who develops a chronic cough with expectoration that is negative for tubercle bacilli should be considered to have a malignancy unless proved otherwise. It is wiser to resect the lung *in toto* rather than to remove only a limited portion. The following evidences of wide-spread extension constituent contrainidcations to radical surgery for pulmonary malignancy: (*1*) bloody pleural fluid; (*2*) paralysis of the corresponding half of the diaphragm; (*3*) paralysis of the left vocal cord in cases involving the left lung; (*4*) severe pain in the thoracic wall or down the arm; (*5*) bronchoscopic evidence of tracheal extension; (*6*) presence of distant metastases; (*7*) advanced age or poor general condition. Bronchial adenomata, considered benign by some, are included under new growths as indications for total pneumonectomy by this author. Seventy-five per cent of bronchogenic carcinomata can be diagnosed by preoperative bronchoscopy and biopsy. Exploratory thoracotomy is indicated in the remaining 25 per cent if there is a reasonable suspicion. Chronic suppurative disease of all the lobes of one lung is best treated by total pneumonectomy. Since congenital cysts are liable to both infection and malignancy, the presence of congenital cystic disease involving all the lobes of one lung is an indication. Certain cases of nonspecific chronic or recurring unilateral pneumonitis associated with a considerable degree of fibrosis respond very favorably to pneumonectomy. Probably some cases of fungus infection will be treated by total pneumonectomy. Pneumonectomy for tuberculosis may be considered for cases in which the main bronchus of the diseased lung contains a stricture which prevents adequate aeration and drainage of secretions, in cases of persistent thick-walled and uncollapsible cavities and in cases in which a universal tuberculous bronchiectasis exists. Probably only a very small number of patients with these conditions will be suitable for surgery and mostly they will be those in

whom a previous thoracoplasty has failed to produce the desired results. A series of 104 cases, 81 of which were for neoplasm, has been done by the author over a period of ten and one-half years. Because of early technique and poorly delimited indications, the author confines discussion of risks to the 75 cases performed since January 1, 1939. Of these, 70 were for neoplasm. The mortality was 30 per cent, but only 12 per cent for the last 25 cases. The operation results in no impairment of function or usefulness. Five patients are well more than five years postoperatively.—*Indications for Total Pneumonectomy, E. A. Graham, Dis. of Chest, March–April, 1944, 10: 87.*—(*K. R. Boucot*)

Postlobectomy Collapse of Lung.—Two forms of collapse are distinguished. Complete airlessness is due to bronchial obstruction in a lung the blood supply of which has remained intact so as to resorb the trapped air completely. Bronchial obstruction may be produced by intraluminal block or by pressure from without of large collections of fluid. The more common form of collapse is incomplete expansion of the lung caused by postoperative infection or trauma, or by adhesions to the chest wall, with consequent distortion. Chronic progressive infection is more likely to occur if the preoperative work-up shows that the lung has been damaged. There may be a history of recurrent pneumonia, and X-ray studies may demonstrate fibrosis, fixation of the interlobar fissures, or distortion of the bronchial tree. The latter is determined by means of iodized oil. Although small areas of lipoid pneumonia may be produced by this means, iodized oil is probably not a factor in the production of postoperative infection and collapse. Various means of creating artificial adhesions of the good lobe to the chest wall have been advocated to prevent postoperative collapse. It seems that the methods used could not be depended upon to form adhesions at the point where they were desired, and intraluminal bronchial obstruction occurred more frequently in cases with adhesions than without. The procedure was, therefore, largely abandoned, and at operation adhesions are frequently severed if it seems likely that they will produce distortion of the lung postoperatively. For anaesthesia, the author favors preoperative medication of scopolamine and pantopon, spinal anaesthesia and the continued administration of oxygen by tracheal catheter. This may also be used to aspirate secretions, if necessary. The breathing is more regular in the conscious patient, and the damming up and spilling over of secretions from the diseased lobe are avoided by the open circuit administration of oxygen instead of the closed circuit positive pressure method. Routine bronchoscopic drainage pre- or postoperatively are not advised and carried out only on indication. Individual ligation of the structures at the hilum is practiced wherever possible. Local antiseptics applied to the pleura may be helpful and will not produce irritation in the usual concentration. Postoperative drainage is not imperative, but if employed should be posterolateral, not dependent but intercostal, and a short tube should be used. This must be attached to an apparatus which maintains negative pressure during ordinary respiration but a positive pressure during coughing. In the prevention of postoperative infection encouragement of cough and emptying of secretions is the most important factor. Breathing exercises are started immediately postoperatively. The oxygen tent is used for a few days, and the patient is maintained in Fowler's position.—*Evaluation and Treatment of Factors Involved in Postoperative Collapse of the Lung, J. Chesterman, Arch. Surg., November, 1943, 47: 448.*—(*H. Marcus*)

Gold Haemagglutination in Tuberculosis.—The diagnosis of primary atypical pneumonia of unknown aetiology is frequently difficult and uncertain. Recently Peterson, Ham and Finland suggested the possibility that the presence of cold autohaemagglutinins might serve as a diagnostic aid in some forms of the disease. Horstmann and Tatlock investigated the problem still further and reported a high incidence of cold isoagglutinins of significant

titre in the serum of patients with atypical pneumonia. The present investigation is an attempt to discover the degree of specificity of cold autoagglutinins and isoagglutinins in random control hospital and clinical patients, as well as to study these reactions in patients with early and late tuberculosis. The latter group was chosen because it not only represented another form of pneumonitis, but a form which, in its early stages, conceivably might be confused with atypical pneumonia. Eighty-two proved cases of tuberculosis and a control group of 18 patients from an acute medical ward and 24 patients chosen at random from the outpatient clinic were studied. Cold isohaemagglutination and autohaemagglutination tests were performed. The results show that in no instance was a positive isoagglutination obtained in a titre of 1:160 or over. One patient in the early tuberculosis group showed a positive test, but no patients with symptoms of one month or less demonstrated a positive reaction. In the control group of ward patients the diagnosis of those reacting positively were hypertensive cardiovascular disease, undiagnosed gastrointestinal disease and nonspecific colitis. No history of virus pneumonia or tuberculosis was obtained from any of these patients. No positive tests were observed in the outpatient clinic control group. Since positive reactions were found in low titre in tuberculosis patients as well as in 3 control patients it should be emphasized that in order that a test be considered positive for atypical pneumonia the cold agglutinins must be present in high titre.—*Cold Hemagglutination Reactions in Tuberculosis, R. S. Siffert & B. Krautman, J. Lab. & Clin. Med., March, 1944,* ***29:*** *270.—(F. G. Petrik)*

Laboratory Diagnosis of Tuberculosis.—The comparative study presented deals with the microscopic examination and animal inoculation. The specimens used in this study were submitted by physicians in North Dakota and at no time were any of the specimens in transit more than forty-eight hours. In the 590 cases examined for tubercle bacilli, animal inoculation proved to be far superior to the microscopic examination. There was complete agreement between the two methods in only 23 instances. In 106 cases there was complete disagreement; the microscopic examination was negative and the guinea pig positive. In only 13 cases were microscopic findings positive and the guinea pig negative. There was complete negative agreement in 433 cases.—*The Laboratory Diagnosis of Tuberculosis: A Comparative Study of Animal Inoculation and Microscopic Examination, M. E. Koons, J. Lab. & Clin. Med., January, 1944,* ***29:*** *75.—(F. G. Petrik)*

Fluorescence Microscopy.—A comparative study was made of various decolorizers and counterstains used in fluorescence microscopy. Twenty smears made from a uniform saline suspension of tubercle bacilli were stained with 0.1 per cent auramine in 5 per cent phenol and treated with various decolorizing and counterstaining solutions. The results show that a slide decolorized with a solution of 25 per cent concentrated sulphuric acid in 70 per cent alcohol, followed by staining with a 1:1000 aqueous solution of potassium permanganate for one second, offered the best visibility. Another slide decolorized with a solution consisting of 3 per cent hydrochloric acid in 70 per cent alcohol and counterstained with potassium permanganate solution and a 1:10 dilution of Loeffler's alkaline methylene blue was second best. A slide decolorized with a solution of 0.5 cc. concentrated hydrochloric acid and 0.5 g. sodium chloride in 70 per cent alcohol and counterstained with methylene blue gave the third best results. Fewer organisms were found on the slides counterstained with methylene blue. While the stronger decolorizing agents appear to improve the fluorescence of the organisms care must be used in accurately timing the decolorizing period to avoid bleaching of the tubercle bacilli.—*Comparison of Procedures for Staining Tubercle Bacilli in Fluorescence Microscopy, H. I. Lee, J. Lab. & Clin. Med., February, 1944,* ***29:*** *218.—(F. G. Petrik)*

Bovine Tuberculosis.—Human tuberculosis caused by the bovine tubercle bacillus is found more frequently in certain countries than in others. It has more often an extrapulmonary localization and is more common in children than in adults. Differentiation of the human and bovine tubercle bacillus by culture is not reliable enough. The best method of differentiation is the intravenous injection of 0.1 mg. bacilli into rabbits; they develop generalized tuberculosis within two months if bovine tubercle bacilli were injected; injection of human tubercle bacilli causes the appearance of only small tuberculous nodules in the lungs. Since 1939 strains of tubercle bacilli from 108 patients were studied at the Hôpital Laval: among 18 children, bovine tubercle bacilli were found in one; among 90 adults, bovine tubercle bacilli were found in three.—*Identification de 108 souches tuberculeuses de types humain et bovin à l'hôpital Laval, M. Giroux, Laval méd., April, 1944, 9: 206.*—(*G. C. Leiner*)

Growth of Bovine Tubercle Bacilli with Pyruvate.—Three newly isolated strains of bovine tubercle bacilli that were unable to grow on Long's medium grew luxuriously on this medium after the addition of 0.1 per cent pyruvate. Of 3 laboratory strains of "dysgonic" bovine tubercle bacilli, 2 showed a similar behavior. Addition of pyruvate had no effect on the growth of 12 human strains of tubercle bacilli.—*Growth Promotion of Bovine Tubercle Bacilli by Pyruvate, C. H. Boissevain, Proc. Soc. Exper. Biol. & Med., December, 1943, 54: 344.*—(*F. B. Seibert*)

Survival of Tubercle Bacilli in Glycerol.—Tubercle bacilli suspended in distilled water in the incubator become nonviable in three weeks in an anaerobic jar but not for a year when kept in contact with air. The presence of glycerol, glycerophosphate, phosphoglycerate, glycerate, lactate, glyceraldehyde or dioxyacetone causes their death. If inorganic salts, as in Long's medium, or pyruvate are added, the bacilli survive for a prolonged period.—*Survival of Tubercle Bacilli in Solutions Containing Glycerol or Its Oxidation Products, C. H. Boissevain, Proc. Soc. Exper. Biol. & Med., December, 1943, 54: 342.*—(*F. B. Seibert*)

Polysaccharide from Tubercle Bacillus.—The rôle of the polysaccharide fraction of the bacillus in the pathogenesis of tuberculosis was investigated. A protein free polysaccharide was isolated from an aqueous extract of approximately 4 kilograms of moist germ mass grown on Dorset's synthetic medium. Twenty milligrams in 1 cc. of physiological saline solution given intraperitoneally was found to be the lethal dose for guinea pigs with generalized tuberculosis, the animals dying within five to eight hours after administration of the dose. None of the nontuberculous animals succumbed to the dosage used. One of the writers (G. V. K.) and 14 members of the hospital staff were given intracutaneous injections of 0.01 mg. made up in saline. Five of the latter group were arrested cases of pulmonary tuberculosis; the remainder had no history of active disease. An immediate reaction was obtained in 7 and a delayed reaction in 8 persons, 5 of each of these had arrested tuberculosis of at least two years' standing. An unusually severe reaction was seen in one subject giving no past history of active disease. An area of erythema appeared within two hours following injection, this gradually became intensely indurated and at its peak measured 8 cm. in diameter. One of the axillary nodes became enlarged and tender. The reaction did not subside until forty-eight hours later and it was not accompanied by any febrile reaction or local necrosis. In the absence of any skin reactivity no changes in the blood picture were observed. When a positive skin test is elicited there occurs a rise in lymphocytes with a fall in monocytes and a shift to the right in the Schilling index. Tests on a group of 67 patients with minimal and far advanced disease showed that the time of appearance, the intensity, size and duration of the local reaction are to be definitely correlated with the extent of involvement in each individual case. An

attempt was made to demonstrate the antibody response which might be elicited by injections of the carbohydrate substance. Sera, from tuberculous patients who had received twelve weekly injections in doses ranging from 0.001 mg. to 0.3 mg., and tuberculous patients and nontuberculous persons who received no injections of the carbohydrate substance, were studied by means of the ring test. The results showed that 5 tuberculous patients developed antibodies following treatment with at least twelve weekly injections of the carbohydrate. The sera from one tuberculous, 2 nontuberculous and one convalescent patient (pleurisy with effusion) contained antibodies for the carbohydrate fraction previous to any injection of this substance. Since the above subjects are members of the sanatorium staff and have been in intimate contact with tuberculous patients for two to seven years, the presence of circulating antibodies in these subjects is understandable. To investigate further the nature of these antibodies, experiments were carried out to determine whether these antibodies would protect tuberculous guinea pigs against the lethal dose of the carbohydrate substance. The results showed that the sera of some tuberculous patients who had not received treatment and who had shown clinical improvement will protect guinea pigs against the lethal dose of the carbohydrate fraction. The sera of nontuberculous humans thus far observed will not protect animals against the lethal dose of the fraction unless the subject has elicited a typical local reaction. Demonstrable antibodies have always been preceded by a rise in the percentage of lymphocytes following injections of the polysaccharide fraction. Since the question of protein nitrogen contaminating polysaccharide fractions is constantly raised it was felt worth while to skin-test a group of 17 nontuberculous persons with 0.0002 mg. of purified protein derivative and two weeks later with 0.01 mg. of the polysaccharide fraction. The results suggest some difference in the nature of the two fractions used. Five negative reactions were obtained with PPD and 2 negative reactions with the polysaccharide fraction.—*Studies on a Polysaccharide from the Tubercle Bacillus, G. V. Kropp & J. A. Foley, J. Lab. & Clin. Med., March, 1944, **29:** 231.—(F. G. Petrik)*

Phthiocerol.—X-ray data suggest the compound is n-tetratriacontane or possibly a mixture of close homologues with a mean molecular weight corresponding to n-$C_{34}H_{70}$. Synthetic n-tetratriacontane shows long spacings and side spacings identical with those of phthiocerol, suggesting that the latter is this normal chain hydrocarbon, and that the probable formula of Stodola and Anderson (J. Biol. Chem., 1936, ***114:*** 467), $C_{34}H_{67}(OH)_2$-OCH_3 is probably correct.—*X-ray Study of the Hydrocarbon from Phthiocerol, E. Stenhagen, J. Biol. Chem., June, 1943, **148:** 695.—(F. B. Seibert)*

Alveolar Lining.—Many pathologists accept the presence normally of alveolar epithelium, which proliferates under various stimulations. Anatomists, on the other hand, disagree as to the structure of the alveolar walls and as to the existence of an alveolar lining. The present paper is a study of the alveolar changes found in human and animal lungs under various pathological conditions. In the lungs of newborn infants, and during normal postnatal life, the alveolar walls are composed of capillaries with a typical endothelial lining. In the interstices between the capillaries, and on the alveolar wall, frequently a characteristic cell is found, probably of mesenchymal origin. These cells have been variously referred to as endothelial or epithelial cells. They apparently partake of characteristics of both and are often referred to in American literature as "septal cells" ("epicytes", "alveolar cells"). This concept is accepted by many anatomists and pathologists although some pathologists still believe that a continuous epithelial lining exists and others, not in agreement with this, either consider the isolated septal cells in the capillary niches as epithelial in origin or even entodermal. The epithelium of the respiratory tract appears to terminate more or less abruptly at the beginning of the alveolar

ducts. The septal cells are easily distinguished from the bronchiolar epithelium. Although isolated septal cells are present, no definite alveolar lining is evident in the lungs of healthy mature animals. Changes in the alveolar lining in pneumonias, infectious granulomata, neoplasms and miscellaneous conditions are described. In bacterial pneumonias septal cell proliferation and the formation of a definite lining is rarely seen unless there is delayed resolution or chronic passive congestion. In pneumonias associated with virus infection septal cell proliferation and the development of an alveolar lining are frequently observed. In lipoid pneumonia there is much cellular proliferation with lining of the alveoli. Physical agents such as X-rays and radium usually result in epithelial anaplasia of both bronchogenic and alveolar origin. Active tuberculous foci commonly exhibit perifocal septal cell proliferation and alveolar lining formation. Lining formation is also apparent along the margins of a tuberculous scar. Although many authors believe that all cancers of the lung are bronchogenic in origin there is much evidence in support of the existence of a specific tumor that arises from the septal cells, lines the alveolar walls, and is entirely independent of the bronchial system. Septal cell proliferation in the alveoli surrounding silicotic nodules is commonly found. In chronic passive congestion of the lung, septal cell swelling is frequently observed. Chronic atelectasis and fibrosis are often accompanied by lining formation. In pleurisy and empyema a definitely increased tendency toward proliferation of the septal cells of alveoli bordering the visceral pleura has long been recognized. Among chronic inflammations in animals "jagziekte" or chronic progressive pneumonia in sheep is especially mentioned. In this condition much alveolar and bronchogenic cellular proliferation occurs. In discussing the developmental stages of lining it is pointed out that the first stage is swelling and prominence of the isolated septal cells and the next stage is actual lining. As the cells increase and their cytoplasm comes in contact with that of adjacent cells, they become low-cuboidal and form an indented, ribbon-like lining. At this point they assume an epithelioid appearance but usually remain attached to the underlying mesenchymal tissue. There is no basement membrane and the lining may be incomplete. Later the cells may exfoliate in small numbers or in rows. In chronic inflammation the proliferation is more apt to result in a complete, firmly attached lining composed of higher cuboidal cells. This lining appears permanent. Overlapping stages in the septal cell reactions are commonly encountered. There are several opinions as to the origin of the "dust cells" or alveolar phagocytes, whether they are free septal cells, arise from the blood stream (monocytes) or from the capillary endothelium. The evidence presented in this paper suggests that a high percentage of the mononuclear phagocytes arise from the septal cells. It does not answer the question why septal cells tend predominantly, under some conditions, to form alveolar linings; under others, to develop mainly into free phagocytes; and, in yet others, to manifest a combination of both features. However, in certain acute inflammatory diseases or in the early stage of chronic inflammation, phagocytic properties seem more pronounced. The cells forming the lining may be phagocytic but not to such a degree as the free cells. It must not be forgotten that the alveoli can be lined by bronchogenic as well as autochthonous epithelium. Each type, however, manifests fairly distinct characteristics. Satisfactory respiratory function is incompatible with extensive cuboidal lining. In acute inflammatory conditions the lining probably disappears with recovery; in chronic diseases the respiratory function is seriously interfered with. (With 4 plates).—*The Pulmonary Alveolar Lining under Various Pathological Conditions in Man and Animals, E. F. Geever, K. T. Neuberger & C. L. Davis, Am. J. Path., November, 1943, 19: 913.*—(*J. S. Woolley*)

Function of Tracheal Mucosa.—The factors responsible for excretion of the respiratory tract fluid up from the lungs and through the

trachea in urethanized, tracheal-cannulated rabbits, cats and dogs have been listed as (*1*) ciliary drainage, (*2*) the movements due to action of the voluntary muscles of respiration, and (*3*) the contractions of the bronchial muscles of Reiseissen. Cough and absorption also play a part but not in the above particular experimental animals. If the drainage mechanisms are ineffective or incapable of excreting the respiratory tract fluid as fast as it is produced, then an increased output of respiratory tract fluid should result from postural pulmonary drainage. In the normal, urethanized rabbit, cat and dog, postural pulmonary drainage does not increase the output of respiratory tract fluid and hence the mechanisms for drainage must be sufficient and effective. When the ciliated mucosa lining the trachea of rabbits and cats is damaged by the inhalation of ammonia or live steam, the output of respiratory tract fluid is doubled or tripled when the animals are posturally drained, but drainage is incomplete and at about the normal rate when the animals are not posturally drained. Hence mechanisms *2* and *3* above may be concluded as geared to handle not more than the normal load of respiratory tract fluid. When the output of respiratory tract fluid in rabbits and cats is doubled or tripled by giving cholinergic drugs or by faradic stimulation of the cervical vagus nerve, the output is not augmented by postural pulmonary drainage, the ciliated mucosa is undamaged and hence it may be concluded that the ciliary drainage mechanism is geared to handle loads of respiratory tract fluid greater than the normal. In sick cats and dogs with a normal tracheobronchial mucosa but with a congestion of the pulmonary alveoli, postural drainage did not augment outputs of respiratory tract fluid, which, on the average, were eight to fifteen times the normal and in individual animals went as high as fifty to one hundred times. Hence the reserve capacity of the cilia to excrete respiratory tract fluid must be very great. Cough is not likely to be useful and productive, therefore, except if there be extensive damage to the tracheobronchial mucosa or where the cilia are bathed in a markedly nonphysiological medium, such as pus. Postural pulmonary drainage is likely to be effective only under the same conditions.—*The Effect of Damage to the Tracheal Mucosa upon the Drainage of Respiratory Tract Fluid, E. M. Boyd, W. F. Perry & Mary E. T. Stevens, Am. J. Physiol., January 1, 1944,* ***140:*** *467.—(G. C. Leiner)*

Vital Capacity under Water.—The vital capacity is about 300 cc. less when the body is immersed in water to the nipple line than it is when the subject is standing in air. When diastolic pressure cuffs are put around the bases of the arms and legs of the subject in water, the vital capacity is about 175 cc. higher than without the cuffs. Indications are that the venous return is increased by immersion sufficiently to increase the load of blood in the lungs and decrease the space available for air.—*Changes in the Vital Capacity When the Body Is Immersed in Water, W. F. Hamilton & J. P. Mayo, Am. J. Physiol., March 1, 1944,* ***141:*** *51.—(G. C. Leiner)*

Physics of Sound.—The application of the principles of physics to the examination of the patient was introduced by Skoda and Hoppe one hundred years ago. Since that time their ideas have been amplified and experimentally verified. The authors believe this knowledge has been neglected in current teaching and offer this review as a guide to the student seeking to acquire skill in the physical examination of the patient.—*The Physics of Sound with Particular Relation to Examination of the Patient, E. M. Chapman & A. Goldstein, J. Lab. & Clin. Med., October, 1943, 28: 1535.—(F. G. Petrik)*

Pulmonary and Coronary Circulation.—The coronary circulation is dependent on the systemic circulation. Its magnitude is determined by the mean pressure in the root of the aorta, and the principal venous channel also empties into the systemic circulation. Changes in the dynamics of the lesser circuit are able to affect the coronary flow only ad-

versely, inasmuch as a pressure increase in the right heart interferes with the venous return of the heart muscle by raising the intramyocardial pressure. The right heart is mainly supplied by the right coronary artery, and since the minute volume of the right heart is usually the same as of the left, and the pressure in the systemic circulation is five times that of the pulmonary circulation, the right heart is more than adequately supplied with blood under ordinary circumstances. Under certain clinical conditions, notably pulmonary embolization, and under experimental conditions, a big load is suddenly thrown upon the right heart and its blood supply may become inadequate. The superficial resemblance of electrocardiographic records during pulmonary embolism to those of myocardial infarction lends some support to the theory that death in pulmonary embolism is indeed due to acute coronary insufficiency and myocardial failure. In the course of experimental investigations with dogs, the relationship between the lesser circulation and the coronary flow has been clarified. Pulmonary embolism was produced by injection of various quantities of barium sulfate intravenously. Pulmonary embolization brings about a sharp rise of pressure in the pulmonary circuit, and with it a steep and quite proportionate drop in the pressure at the root of the aorta and in greater circuit. A sudden decrease in coronary flow was the consequence, and in large or repeated embolizations a reversal of the pressure relations took place. Although the heart as a whole suffered from this change in haemodynamics, the right heart was under greater strain than the left. It was called upon to do more work to overcome the increased pressure in the pulmonary circuit, and in addition the coronary vessels in the myocardial wall of the right heart were under higher pressure during diastole than the pressure supplied by the coronary artery, so that during diastole the coronary flow was zero. The marked increase in pressure in the pulmonary artery is not to be explained by the obstruction of the circulation by the embolus. An embolus of the size commonly seen cuts off not more than 1/100 to 1/50 of the pulmonary circulation, whereas experimentally the pulmonary artery may be clamped off from the outside so as to obstruct from 50 to 60 per cent of its flow without any rise in the pulmonary arterial pressure. The main difference is that in one case the obstruction is intravascular, in the other extravascular, and the explanation lies in a series of intrapulmonary vascular reflexes which cause spasm of the smallest pulmonary arterioles and venules, thus impeding the flow enormously. Recovery from experimental as well as clinical embolization is initiated by an enormous vasodilation of the coronary arteries which increases the coronary flow as measured by the *Stromuhr*. This dilatation is directly proportional to the rise in pulmonary arterial pressure and inversely proportional to the drop in systemic pressure. It is independent of all extracardiac nervous influences and is due to a local metabolic reflex within the cardiac muscle itself, probably initiated by the capillary walls and being transmitted to the stem of the arteries. Its magnitude depends on the immediate need of the cardiac muscle. In pulmonary embolization the dilatation of the right coronary artery is greater and more prolonged than of the left. Important as the coronary vasodilatation is during the immediate postembolization period, that is, during the first fifteen to sixty seconds, recovery is eventually brought about by a rise in systemic pressure and complete or partial restitution of coronary arterial pressure. This is the result of all general pressor reflexes in the systemic circuit. Pulmonary depressor reflexes and cardiac depressor reflexes apparently play no rôle in this, as they are always accompanied by slowing of the heart, whereas in pulmonary embolization tachycardia is the rule.—*Die Beziehungen zwischen Lungenkreislauf und Koronarkreislauf, C. Kroetz, Schweiz. med. Wchnschr., March 13, 1943, 73: 321.*—(*H. Marcus*)

Circulatory Pressures and Cough.—Differential pressure records are shown which separate the changes in arterial pressure which are due to simple propagation of intrathoracic

pressure from those which are due to changes in blood flow. It is shown that increases due to the first of the above causes strain only the peripheral arteries whereas increases due to changes in blood flow or to changes in peripheral resistance strain also the vital arteries to the brain, spinal cord and viscera. During cough or strain the rise in jugular pressure lags behind the rise in both thoracic and spinal pressure. During the preliminary pressure rise of the cough, people whose circulation is hypodynamic show arterial pressures which are no higher than simultaneous intrathoracic pressures. During brief intervals there is therefore no effective head of pressure to irrigate the coronary or other vital vascular beds. During the expulsive phase of the cough the arterial pressure may continue to rise while the intrathoracic pressure is going down or the arterial pressure may descend more slowly than the intrathoracic pressure. This signifies that the pressure distending the aorta is rising and, since it often occurs during diastole, it implies that during the expulsive phase of a cough blood is forced from the lungs through the relaxed left heart and into the aorta. The cough may force blood into the aorta in cases with hypodynamic circulation and in cases with congestive heart failure. This may occur in normal individuals but no evidence has been obtained to support the idea that it does.—*Arterial, Cerebrospinal and Venous Pressures in Man During Cough and Strain, W. F. Hamilton, P. A. Woodbury & H. T. Harper, Jr., Am. J. Physiol., March 1, 1944, 141: 42.*—(*G. C. Leiner*)

Respiration and Blood Pressure.—The influence of breathing, inspiratory and expiratory apnoea, the Valsalva test and coughing on the intraärterial pressure in man was studied. Two types of waves were found: (*a*) vasomotor waves, which are independent of the respiratory movements and should be called by the names of their discoverers, Traube and Hering; and (*b*) blood pressure waves depending on the respiratory movements (respiratory waves). The intraärterial pressure has no uniform or fixed behavior during the respiratory movements but may rise or fall in accordance with the type of breathing—thoracic or abdominal—or with the frequency or depth of respiration. Even during ordinary breathing, slight changes are noticeable, the most constant being a fall of blood pressure during inspiration and an elevation during expiration. With deep, slow thoracic breathing there usually occur an inspiratory fall and an expiratory rise of the blood pressure. The opposite, as a rule, is true of abdominal breathing of the same type. Curves of intra-arterial pressure registered during inspiratory apnoea and the Valsalva test show a definite fall of blood pressure at the beginning, while those taken during expiratory apnoea are characterized by a slight initial fall and a terminal rise. Coughing causes great increase in the blood pressure.—*Influence of Respiration on Blood Pressure in Man: With a Note on Vasomotor Waves, A. Battro, R. González Segura, C. A. Eliçabe & E. Araya, Arch. Int. Med., January, 1944, 73: 29.*—(*G. C. Leiner*)

Blood Iron in Tuberculosis.—Both anaemia and a decrease in the plasma iron are common findings in tuberculosis. Normal values of plasma iron are from 0.12 to 0.15 mg. per cent. Plasma iron was studied in 72 tuberculous patients. It was found that it varied directly with the severity of the disease. The values were normal in moderately advanced cases and markedly reduced in serious and cachectic cases. For the latter type of patient the value was from 0.025 to 0.05 mg. per cent. Two factors are operative in determining the value, namely, the infectious disease itself, and the presence and height of fever. Plasma iron was found to be reduced after artificial fever therapy for nervous diseases. Generally speaking, blood iron values and plasma iron values parallel each other. Anaemia and hyposideraemia are thus constant findings in advanced tuberculosis. The therapeutic value of iron administration was investigated in a number of cases. After a single dose of iron, maximal plasma values are reached after two hours. The rise is insignificant when the

initial value is low, and considerable when the initial value is normal. The relationship between initial level and increase after a single dose is expressed in a steeply rising straight line. Clinically, iron medication is of no value in treating either the anaemia or the hyposideraemia of tuberculosis. In unfavorably progressing cases no elevation of either value can be achieved by iron therapy. In favorably progressing cases the food iron alone is sufficient to raise the blood iron values, and no quicker response is obtained by giving additional iron. Unless the anaemia is due to haemorrhage in an otherwise favorably progressing case it is useless to administer iron in any form in tuberculosis.—*L'anémie et hyposidérémie des tuberculeux Étude pathogénique et thérapeutique, A. Reginster, Schweiz. med. Wchnschr., October 23, 1943, 73: 1295.*—(*H. Marcus*)

Tuberculosis of Lymphatic System.—In its localization, this disease shows great similarity to sarcoidosis. The lymphatic and haematopoetic systems are primarily affected with only secondary extension to other organs. Clinically, the disease is characterized by a course quite different from sarcoidosis. The patients are subacutely ill from the onset, and become severely ill as the disease proceeds to its usually fatal termination. The early clinical course is characterized by some degree of fever, constitutional symptoms and lymph node enlargement. The lymph nodes are usually firm and do not break down easily. They may reach considerable size, and diagnosis by aspiration is usually easy. The nodes in the neck are most prominently involved, but all nodes share in the enlargement, and abdominal symptoms due to massive abdominal lymph node involvement is common. The blood frequently shows marked changes but no one change is characteristic. The peripheral blood picture may be normal or it may show a leukaemic or agranulocytic picture, and aplastic anaemia may be simulated. Death occurs after a period of months or even years, and is eventually due to tuberculous involvement of the lungs and other organs, which is frequently of a miliary type. Long remissions with eventual death have been reported. At autopsy the striking finding is enlargement and caseation of the lymph nodes. It is believed that the tuberculous infection localizes in the lymph nodes and through a peculiar allergy or anergy stimulates them to great hyperplasia. This is soon followed by central caseation and as hyperplasia proceeds peripherally the caseation process also spreads peripherally from its central origin. The bone-marrow findings are not typical and give little clue as to the origin of the striking findings in the peripheral blood. Apparently the blood reaction is dependent on the involvement of the spleen, because in one case report a leukaemic picture disappeared following splenectomy. In cases of depression of bone-marrow activity a toxic reaction is the most likely cause, although miliary tuberculosis of the bone-marrow is a possibility. This, then, is a characteristic atypical form of tuberculosis. To date only 10 cases of this type have been reported in the literature.—*Die generalisierte verkäsende Tuberkulose des lymphatischen-hämatopoetischen Systems Eine neue Form der atypischen Tuberkulose, St. J. Leitner, Schweiz. med. Wchnschr., January 8, 1944, 74: 8.*—(*H. Marcus*)

Tuberculosis of Spleen.—Although tuberculosis of the spleen is not infrequently found at autopsies, it is rarely diagnosed *intra vitam* because it does not produce any characteristic symptoms. A twenty-four year old white woman was seen with the following symptoms: loss of appetite, pain in the epigastric region, nausea, vomiting, occasional diarrhoea, loss of weight. Gastro-intestinal series was negative. However, on the left side of the vertebral column at the level of the first lumbar vertebra there were several dense calcified spots. By injecting air per rectum the calcified spots were seen to be within the opaque shadow of the spleen. Fluoroscopic examination showed the calcified spots to move with respiration. X-ray films of the chest showed arrested bilateral tuberculosis with calcification of the hilar lymph nodes. The tubercu-

lin patch test was strongly positive. The diagnosis of tuberculosis of the spleen was made and the question of advisability of splenectomy is raised.—*Tuberculosis of the Spleen, R. Francisco, Bol. Asoc. méd. de Puerto Rico, January, 1944, 36: 21.*—(*G. C. Leiner*)

Tuberculosis of Spleen.—Although this is a rare cause of splenomegaly it is of importance because of the curative value of splenectomy. The disease in the spleen may be acute, subacute or chronic. The largest spleens are seen in the chronic cases. Although the disease is, strictly speaking, not primary in the spleen, this may be the only active focus at the time, and surgical treatment is indicated as much as in isolated renal tuberculosis. The outcome was favorable in a forty-seven year old Negro who had an indefinite history of fever, sweats, weight loss and dizziness. Examination showed splenomegaly, hepatomegaly, profound anaemia, and enlarged cervical nodes. Biopsy of one of these showed tuberculosis, and a preoperative diagnosis of tuberculosis of the spleen was made. Following transfusion, a large spleen was removed at operation. Even grossly the diagnosis of tuberculosis was suggested. There were numerous adhesions to the pancreas, diaphragm and the parietes. The liver was enlarged but showed no sign of tuberculosis. The patient ran a prolonged febrile course postoperatively but eventually recovered completely. Microscopically the spleen showed large areas of caseation necrosis with round cell infiltration and tubercle formation with giant cells.—*Primary Tuberculosis of the Spleen, H. Coffee & S. Lipton, Arch. Surg., November, 1943, 47: 478.*—(*H. Marcus*)

Tuberculosis of Oral Mucosa.—Tuberculosis of the oral mucous membrane is not rare, but it is often difficult to decide whether or not it constitutes the primary focus. If the lesion is primary it consists of a small ulcer which is often surrounded by heaped-up granulations of secondary origin. The lymph node component is found underneath the horizontal ramus of the mandible. Carious teeth seem to predispose to localization on the gums. Direct spread from there to the hard palate, and to other locations in the mouth is common. Six cases are reported in this paper, 2 of which came to autopsy. The cause of death was tuberculous meningitis occurring within a few weeks after the discovery of the primary focus. The ages of the patients were six and seven years, respectively. Four other cases were proved by biopsy and aspiration of the lymph nodes. Lesions of the oral mucous membrane show a good healing tendency and cure is the rule unless generalization occurs.—*Über primäre Mundschleimhaut-Tuberkulose, H. Wissler, Schweiz. med. Wchnschr., December 11, 1943, 73: 1483.*—(*H. Marcus*)